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09/997,602	11/29/2001	Thomas W. Lanzatella	1557.001US1	5150

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EXAMINER	
LE, DEBBIE M	
ART UNIT	**PAPER NUMBER**
2168	

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/997,602	LANZATELLA ET AL.	
	Examiner	Art Unit	
	DEBBIE M. LE	2168	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's arguments filed on 8/21/06. Claims 1-26 are pending for examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Tamer et al (US Patent 6,938,059 B2) (hereinafter Tamer).

As per claim 1, Tamer discloses a method to map a storage environment data object, comprising;

receiving a reference to the data object (col. 2, lines 22-23, as an application accesses a logical object) (Fig. 7, # 210) **in a first storage environment** (i.e., host computer) (Fig. 7, # 220), **wherein the data object resides in a second storage environment** (col. 2, lines 18-19, as logical object is stored in the physical space 230) (Fig. 7, # 230);

generating a first data structure from the reference representing one or more physical locations of the data object within the second storage environment (col. 2, lines 25-26, col. 8, lines 46-47, as mapping layer uses the logical object identifier to identify the physical locations in the storage devices 241-243 within the physical space 230, wherein the mapping layer 220 is typically organized as a data structure that assigns unique locations in physical space 230 to the block of data that form each of the logical objects identified in the application space);

associating a signature (as disk D1, blocks 100-103, Fig. 10) **with the data object** (as file A, Fig. 10, 210) **wherein the signature is indicative of a state of the data object** (Fig. 10, # 230, as physical storage devices 230 contains the number of disks (volumes), whereas each disk has been assigned such data blocks and col. 4, lines 46-64, metadata for each logical object, tells the location of the logical object);

retaining the first data structure in the first storage environment (col. 22, lines 34-37, as the mapping layer 220 retains the mapping information that is determined at each layer of the hierarchy, Tamer further discloses at col. 2, lines 63-67, col. 3, lines 1-15, as the mapping layer 220 handles this mapping task, the mapping

layer 220 includes a number of mapping layer such as file system and logical volume manager);

updating the signature to reflect a change in the state of the data object, wherein a determination to update the signature is performed in the second storage environment (col. 17, lines 5-60, as thus, an intelligent storage system 740 (Fig. 7) employs additional mapping layer that is transparent to the host system's mapping layer 220. The mapping done on an intelligent storage system 740 be optional, but it can perform in the same manner as the host system, that would have no impact for interfacing between the host and the storage system 740);

querying the second storage environment (Fig. 12, # 1230, as querying intelligent storage device) **for a change to the signature in preparation for a data access operation on the data object** (col. 22, lines 44-53, col. 23, lines 1-13, as determining whether the *storage device is added* to the computer system);

updating the first data structure if the signature has changed (col. 14, lines 33-38 that "A command utility can be executed on the host computer that keeps a record of file system and/or LVM that is loaded at system startup. Such a command utility can also be executed periodically, as a background task, *to update the record of the mapping layer 220 in the event that another file system or LVM is subsequently mounted*", or col. 14, lines 10-29, as determining whether *the storage device is added* to the computer system, the number of mapping layers present on the host computer changes, then updated only as needed when changes are made to the mapping layer 220 on the host computer); **and**

performing the data access operation using the first data structure to interface with one or more of the physical locations of the data object from the first storage environment (col. 27, lines 17-19, col. 30, lines 25-30, abstract, as providing the physical location of the specified logical object to the application program for manipulating logical object in a data storage system).

As per claim 2, Tamer teaches wherein in retaining the first data structure one or more additional references access the data object using the first data structure (col. 22, lines 50-53).

As per claim 3, Tamer teaches wherein receiving the reference an operating system of the first storage environment does not support the second storage environment (col. 22, lines 5-12).

As per claim 4, Tamer teaches wherein during generation one or more extents of the data object within the second storage environment are provided col. 22, lines 63-67).

As per claim 5, Tamer teaches wherein the generation further includes detecting a mirroring of the data object on at least two storage devices within the second storage environment (col. 5, lines 14-21).

As per claim 6, Tamer teaches wherein during generation metadata associated with the second storage environment and the data object are provided (col. 5, lines 23-27).

As per claim 7, Tamer teaches wherein in retaining the first data structure the first data structure is validated with one or more subsequent references made to access the data object (col. 16, lines 5-17).

As per claim 8, Tamer teaches wherein the method is used to interface a first database using the first storage environment with a second database using the second storage environment (col. 27, lines 35-40, col. 254, lines 40-65).

As per claim 9, Tamer discloses a method to represent a data storage object, comprising:

identifying one or more storage locations for the data storage object housed within a first storage environment (col. 2, lines 25-26, col. 8, lines 46-47, col. 15, lines 52-56, as mapping layer uses the logical object identifier to identify the physical locations in the storage devices 241-243 within the physical space 230);

assembling a hierarchical map representing a path to one or more of the storage locations (col. 21, lines 35-36, as hierarchical view of the mapping of a specified logical object);

associating a signature (as disk D1, blocks 100-103, Fig. 10) **with the map** (as file A, Fig. 10, # 210) **indicative of a state of the data storage object** (Fig. 10, # 230, as physical storage devices 230 contains the number of disks (volumes), whereas each disk has been assigned such data blocks and col. 4, lines 46-64, metadata for each logical object, tells the location of the logical object);

querying the signature (Fig. 12, # 1230, as querying intelligent storage device) **for changes in preparation for a data access operation on the data storage object** (col. 22, lines 44-53, col. 23, lines 1-13, as determining whether *the storage device is added* to the computer system);

updating the map if the signature has changed (col. 14, lines 33-38 that "A command utility can be executed on the host computer that keeps a record of file system and/or LVM that is loaded at system startup. Such a command utility can also be executed periodically, as a background task, *to update the record of the mapping layer 220 in the event that another file system or LVM is subsequently mounted*", or col. 14, lines 10-29, as determining whether *the storage device is added* to the computer system, the number of mapping layers present on the host computer changes, then updated only as needed when changes are made to the mapping layer 220 on the host computer) **and**

using the map in a second storage environment to access the data storage object (col. 27, lines 17-19, col. 30, lines 25-30, abstract, as providing the physical location of the specified logical object to the application program for manipulating logical object in a data storage system).

As per claim 10, Tamer teaches wherein while assembling the map attribute data are acquired and associated with the first storage environment (col. 22, lines 60-62).

As per claim 11, Tamer teaches wherein assembling further includes acquiring attribute data associated with the data storage object (col. 22, lines 62-65).

As per claim 12, Tamer teaches wherein in identifying one or more of the storage locations, the data storage object is identified as at least one of a file system, a file, a database, a volume, and a portion of data within a file (col. 2, lines 44-45).

As per claim 13, Tamer teaches wherein the method is repetitively processed for one or more additional data objects residing in the first storage environment (col. 22, lines 50-53).

As per claim 14, Tamer teaches wherein the method is used to create an image or copy of the first storage environment in the second storage environment (col. 3, lines 40-45).

As per claim 15, Tamer discloses **a first computer readable storage medium having a data map** (as mapping layer, Fig. 7, # 220) **and a signature** (as disk D1, blocks 100-103, Fig. 10) **representing a data object** (as logical object (i.e., file), Fig. 10, # 210, file A) **residing on a second computer readable storage medium** (as physical storage device 230, Fig. 7, # 230), **wherein the signature is indicative of a state of the data object** (Fig. 10, # 230, as physical storage devices 230 contains the number of disks (volumes), whereas each disk has been assigned such data blocks and col. 4, lines 46-64, metadata for each logical object, tells the location of the logical object), **the map comprising:**

a first node representing the data object (as application space, Fig. 7, # 210);

a file system node representing a file system on the second computer readable storage medium (as file system, Fig. 7, 222, Fig. 10, # 222);

a volume node representing a volume manager associated with the file system (as logical volume manager 224, Fig. 7, # 224, Fig. 10, # 224);

one or more partition nodes managed by the volume manager (col. 3, lines 1-15, as logical volume manager having a number of storage devices);

one or more disk identifications representing one or more storage devices housing the data object (Fig. 7, # 741-743, as disk1...$disk_n$); **and**

wherein the map is updated when a change to the signature is detected (col. 14, lines 33-38 that "A command utility can be executed on the host computer that keeps a record of file system and/or LVM that is loaded at system startup. Such a command utility can also be executed periodically, as a background task, *to update the record of the mapping layer 220 in the event that another file system or LVM is subsequently mounted*", or col. 14, lines 10-29, as determining whether *the storage device is added* to the computer system, the number of mapping layers present on the host computer changes, then updated only as needed when changes are made to the mapping layer 220 on the host computer).

As per claim 16, Tamer teaches wherein the map is represented as a tree data structure on the computer readable storage media (col. 21, lines 35-37, as mapping in the hierarchy of each layer).

As per 17, Tamer teaches wherein each node includes metadata (col. 5, lines 30-38).

As per claim 18, Tamer teaches wherein the map is used by an accessing set of executable instructions having access to a second file system which is incompatible with the first file system (col. 27, lines 35-59).

As per claim 19, Tamer teaches wherein the data object is referenced and modified by the accessing set of executable instructions from the second file system (col. 26, lines 39-65).

As per claim 20, Tamer teaches wherein the map is updated if one or more values associated with one or more of the nodes or identifications are modified (col. 14, lines 10-29, as when the number of mapping layers present on the host computer changes, then updated only as needed when changes are made to the mapping layer 220).

Claim 21 is broader claim than independent claim 1, therefore, it is rejected by the same rationale as claim 1 arguments.

Claim 22 has similar limitation as claim 20, therefore, it is rejected under the same subject matter.

Claims 23-24 have similar limitation as claim 18, therefore, they are rejected under the same subject matter.

As per claim 25, Tamer teaches wherein the map is used to replicate the second file system within the first file system in a first file system format (col. 5, lines 35-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamer et al (US Patent 6,938,059 B2) (hereinafter Tamer) in view of Agarwalla et al (US Patent Application Publication 2003/0061278 A1).

As per claim 26, Tamer does not explicitly teach creating a portable representation of the data structure using extensible markup language (XML); and distributing the portable representation to a third storage environment over the Internet. However, Agarwalla teaches creating a portable representation of the data structure using extensible markup language (XML); and distributing the portable representation to a third storage environment over the Internet (parg. 0054, 0063, 0017, as XML document is used to introduce a tag set for conveying content distribution information,

for instanct, in a directory structure (i.e., file path name and file name), wherein the file name relates to physical locations on storage devices), in a combination of elements of independent claims. Thus, it would have been obvious to one of ordinary skill on the art at the time invention was made to combine the teachings of the cited references in provide the steps of using XML for representing the data structure and distributing it over the Internet as disclosed by Agarwalla because it would improve on enterprise's web-enabled applications for using information and services of other enterprises around the globe (i.e., distributed computing environments in a Web-based computing).

Response to Arguments

Applicant's arguments filed 8/21/06 have been fully considered but they are not persuasive.

Applicant argues that Tamer does not teaching or suggest a determination to update the signature is performed in the second storage environment because the mapping functions and metadata are performed at the host computer.

In response, the examiner has carefully reviewed Tamer's reference and still believe Tamer discloses Applicant's newly amended claim limitation and have fully addressed in Detailed Office Action above of independent claim 1 rejection.

Second, Applicant argues that Tamer does not teach updating the first data structure if a signature indicative of a state of the data object has changed because Tamer teaches querying a storage device for internal structure information (e.g., as

mapping) and this internal information does not relate to a signature which was associated with data object and which is indicative of a state of the data object.

In response, the examiner respectfully submits that Tamer discloses the where the internal operations in the intelligent storage device can read and write of data to an appropriate device (e.g., one of disk drives 741-743) within the intelligent storage 740, wherein the intelligent storage 740 can include a list of arguments indicative of the physical locations to be deleted (i.e., by overwriting), the intelligent storage system 740 also be configured so that the addresses it receives define the actual physical addresses in physical space 230. Thus,Tamer not only teaches querying a storage device for internal structure information, such as mapping of logical volume address to the corresponding physical blocks on the storage device as argued by Applicant, but Tamer also teaches the intelligent storage system 740 also be configured. The step of configuring the intelligent storage 749 would be equivalent to Applicant's claim limitation "updating the first data structure if a signature indicative of a state of the data has changed."

Accordingly, Tamer does teach the Applicant's claim language querying the second storage environment for a change to the signature and updating the first data structure if a signature indicative of a state of the data has changed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEBBIE M. LE whose telephone number is (571) 272-4111. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Vo can be reached on (571) 272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DEBBIE LE
PRIMARY EXAMINER
10/10/06